

POSSIBLE SOLUTIONS

NRM Recommendations

- The committee believed that the best solution is to reconfigure the GLONASS frequency plan to avoid sharing a common frequency band. One of the suggestions was to incorporate a frequency reuse plan where a satellite on the opposite side of the earth would operate on the same frequency. This would not present a problem to the aviation community or ground based users as only one of the two satellites operating on the same frequency could be in view. If this approach were incorporated the highest center frequency would be 1608.75 MHz which after application of the spread navigation code would provide a guard band of less than 1 MHz to the MSS lower band edge. (Note: The GLONASS systems interferes with radio astronomy in the 1610.6 to 1613.8 MHz band. By restructuring the GLONASS frequency plan as mentioned plus appropriate filtering on the GLONASS spacecraft, much of this interference can be reduced. However, when GLONASS transmits on its high precision P code with its ten times wider modulation spectrum, the interference into RA is severe -- all the way into the 1660 to 1670 MHz RA bands.)

Alternate Solutions

- It is assumed that if there are sufficient GLONASS satellite transmissions below 1610 MHz which can be received by a GNSS receiver to provide the desired level of integrity, then any MES transmissions which corrupt GLONASS transmissions above 1610 MHz would be acceptable to the aviation community. A dual transmitter would be used on each GLONASS satellite so that it transmits on its own primary frequency plus a secondary frequency which is also the primary frequency of the anti-podal satellite. By a proper selection of operating frequencies in orbital locations, one could place an operating frequency in both the lower 12 frequencies in orbital locations, one could place an operating frequency in both the lower 12 frequencies and the higher 12 frequencies aboard each satellite. Thus, all 24 frequencies would be transmitted in each hemisphere of satellites.
PROS: Would provide a redundant capability to the available GLONASS constellation and would allow GLONASS and MSS to share the common frequency band.
CONS: Requires an extra operating transmitter on board the satellites. Power, mass costs are not known. Does not improve radio astronomy problem in fact, it provides more interference.
- To improve the performance in the RA band, the previous dual transmit scheme would be used except for center frequencies which would provide interference into RA when operating with just the non-precision codes. This would then delete 7 primary frequencies and 7 secondary frequencies. Only ten satellites would actually

operate in the dual frequency mode.

PROs: It would significantly lessen the interference into RA when only the lower precision code is being transmitted, would provide a redundant capability to the available GLONASS constellation (although lower than in the previous solution) and would allow GLONASS and MSS to share a common frequency band.

CONS: Requires an extra operating transmitter on board ten satellites. Power, mass costs are not known as before. Does not improve radio astronomy problem when GLONASS is transmitting the P code.

CERTIFICATE OF SERVICE

I, Andrew F. Taylor, hereby certify that on this 19th day of July, 1993, copies of the foregoing "Comments of Loral Qualcomm Satellite Services, Inc." were mailed, postage prepaid, to the following:

Lon C. Levin
Vice President
American Mobile Satellite Corp.
1150 Connecticut Avenue, N.W.
4th Floor
Washington, D.C. 20036

Bruce D. Jacobs, Esq.
Glenn S. Richards, Esq.
Fisher, Wayland, Cooper & Leader
1255 23rd Street N.W.
Suite 800
Washington, D.C. 20037

Victor J. Toth, P.C.
Law Offices
2719 Soapstone Drive
Reston, VA 22091

Norman P. Leventhal
Raul R. Rodriguez
Stephen D. Baruch
David S. Keir
Leventhal, Senter & Lerman
2000 K Street N.W.
Suite 600
Washington, D.C. 20006-1809

James G. Ennis
Barry Lambergman
Fletcher, Heald & Hildreth
P.O. Box 33847
Washington, D.C. 20033-0847

Robert A. Mazer
Albert Shuldiner
Nixon, Hargrave, Devans & Doyle
One Thomas Circle, N.W.
Suite 800
Washington, D.C. 20005

Jill Abeshouse Stern, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N Street N.W.
Second Floor
Washington, D.C. 20037

Cheryl Lynn Schneider
COMSAT
6560 Rock Spring Drive
Bethesda, MD 20817

The Honorable Larry Irving
Assistant Secretary of Commerce
for Communication and Information
National Telecommunications and
Information Administration
U.S. Department of Commerce
14th & Constitution Avenues, N.W.
Washington, D.C. 20230

Philip L. Malet
Steptoe & Johnson
1330 Connecticut Ave. N.W.
Washington, D.C. 20036

Richard Parlow
Associate Administrator for Spectrum

Lawrence Palmer
Director, International Affairs